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Urban small sites – landscape ecology and contribution to urban greenspace

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Abstract

Urban areas are highly modified and complex landscapes, within which green spaces are seen as valuable for human well being as well as wildlife. Most studies evaluate the significance of the upper end of this spatial scale (>10ha), and ignore the smaller patches (<1ha). Despite this omission it is likely that small patches of greenspace constitute a significant absolute area and a dynamic and potentially useful green resource, the value of which has not been systematically assessed at either the landscape or the patch scale. Using a combination of OS Mastermap data and field visits, a GIS was generated of a transect line in urban Wolverhampton. The primary conclusion reached from this study was that small sites that are not audited for practical reasons can provide as much in terms of variety and quality as sites above recommended thresholds without detracting from meaningfulness or deliverability.

Keywords, urban, greenspace, GIS, small sites

Introduction

Urban landscapes are a mixture of built, semi-built and open areas of space that contain a wide variety of different land uses. They are of such importance due to the concentration of human population into these areas. Urban greenspace comes in a variety of forms from large formal parks to incidental patches as a result of development. Greenspace provision and realisation has changed with prevailing social-economic-political regimes and landscape styles (Jim, 2004) and as a result conflicts occur between economic development, residential space requirements and urban greenspace allocation/preservation. Greenspace management should therefore account greenspace as a "salad bowl rather than a melting pot" (Thompson, 2002), and consequently, all sites should be considered as potential manageable resources.

Small Sites

Smaller sites in urban environments are often a result of the temporal fragmentation of the landscape (Collinge, 2006) commonly due to continuing development and demand for the built environment. Forman (1995) invites discussions over which strategies are preferable; Large or Small (LOS) and Single Large or Several Small (SLOSS). Mixed large and small patches together appear to be more desirable than homogeneous patch sizes (Li *et al*., 2008) due the increase in both physical and functional connectivity for wildlife and access for

people. For these reasons retaining numerous small green areas throughout a city could be preferred to a smaller number of larger parks (Morancho, 2003).

There is, however, a lack of scientific research and quantitative data on the true intrinsic value of small greenspace patches, indeed there is no recognised definition of the word small, and Thompson (2002) argues that "the challenge is to determine at what level of detail we should be looking for the 'grain', or smallest unit, of public greenspace, and the extent, or upper limit of our system". Natural England (2008) in the Accessible Natural Greenspace Standard (ANGSt) model specifies that no person should live more than 300m from their nearest area of natural greenspace of at least 2ha in size. For greenspace auditing professional bodies including Natural England (2008) and others recommend that for practical or arbitrary reasons and in order to deliver results that are meaningful and deliverable that thresholds of 0.2ha or 0.25ha should be set, below which greenspace patches are not audited. It is the sites that fall below this threshold (0.2ha) in particular that this study focuses on and in the context of this study it is these sites that constitute 'small' sites.

The overall aims of this study were:

- To assess the intrinsic character and overall contribution of small sites to the totality of urban greenspace.
- To establish the contribution of small sites to urban greenspace management.

Methodologies

Using OS Mastermap data, field visits to greenspace sites and aerial photograph interpretation, a dataset was created on a GIS of a transect line using 7x1km^2 grids in Wolverhampton stretching from the CBD to the northern greenbelt boundary. Within this transect a total of 1692 greenspace sites were identified and visited where possible (Aerial photograph interpretation was used where access was not possible). Each of these sites was categorised qualitatively in terms of the overall habitat type and assigned scores based on a set of physical attributes present within the site.

Flora - 1: homogenous: <2 succession phases of habitat
2: diverse: >2 habitat phases

Fauna - 0: No sign of any presence of birds or mammals identified at site
1: Indirect indicators of fauna activity (e.g. birds nest, droppings, tracks)
2: Direct observation of fauna on patch at visit

(Note that this was not a specific ecological study examining fauna activity, each site, where possible was visited once and data was recorded at the time of visit, between 9am and 5pm during the months September to October (sites with no access were given a score of 0).

Access – 0: No access
1: Limited access (e.g. a fee/permission required)
2: Open access
3: Open access, informal footpaths
4: Open access, formal footpaths

Trees – 0: No trees present
1: Trees present

This method gave each site a score from 1-10 to provide an indication of quality.

Results and Analysis

Patches were examined at intervals of 0.2ha below 2ha and 0.02ha below 0.2ha. This provided a detailed breakdown of sites that fell below ANGSt standards and also sites identified by this study as 'small'.

Table 1. Summary of grid square data, grid 1 is the greenbelt boundary and grid 7 is Wolverhampton CBD.

Grid	No.patch	Total area ha
1	191	81.1
2	230	26.9
3	142	12.6
4	162	45.1
5	326	46.1
6	314	22.6
7	327	8.8
Total	1692	243.4

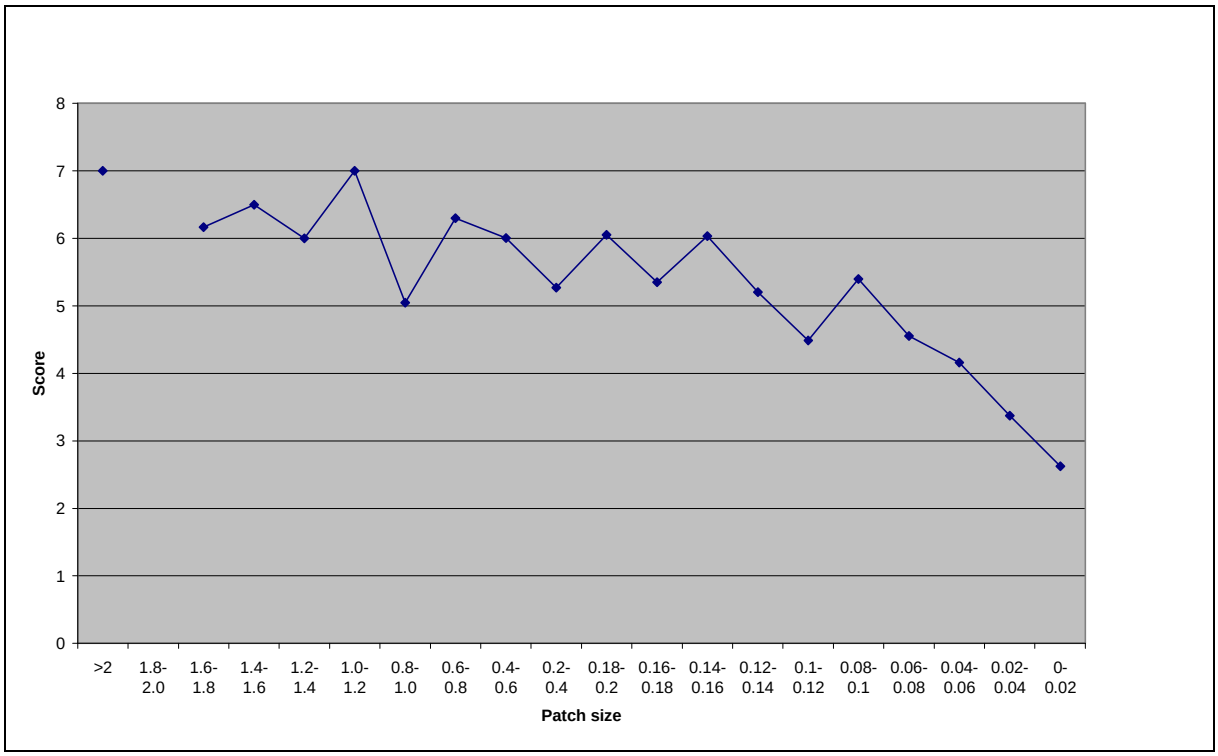

Figure 2. Score. The average score of all the sites in the study transect. The gap in the line is due to the absence of individual of patches between 1.8-2ha in area.

Table 1 shows a general decline in greenspace across the transect line. The temporary rise in grids 4 and 5 are the result of a golf course and a large urban park – characteristic suburban greenspace features. Elsewhere the patch numbers increase indicating both an increase in fragmentation and a commensurate increase in small patches (as a result of a decrease in total patch area) as proximity to the CBD decreases.

Patches <0.2ha contribute 18% of all greenspace in the study area. Further analysis has identified that much of this greenspace is <0.05ha and provides little in terms of relative value, however it must be noted that this does not imply that they provide no value, as every patch of green space may perform one or many of a variety of important functions. The mean score of patches at the set size intervals for the study area (figure 1) show the importance of the larger patches but it also shows that those sites below auditing thresholds still score at a similar level as intermediate sites until about 0.05ha, where the mean score declines markedly.

Conclusion and further studies

This initial study indicates that firstly, small sites contribute significantly to overall greenspace provision in terms of both total area and patch number. Secondly, the data suggests that small sites of between 0.05ha and 0.2ha may provide as much in terms of variety and quality as intermediate-sized sites above the 0.2ha threshold without creating an audit that is not meaningful or deliverable from practical and quality perspectives. In terms of the LOS or SLOSS argument introduced earlier, this study does not offer a decisive polar argument, but rather that LAS and SLASS (large AND small or single large AND several small) may be more suitable phrases due the similarity of 'small' sites to larger sites, and a network of managed patches of different sizes is preferable.

This study is currently being expanded to include the wider West Midlands region, and is looking at improving the quantitative texture of the data and including more detailed studies into the ecology of small sites. However even with this pilot study completed it is possible to identify the importance of the specific role small sites could play in a truly holistic greenspace management strategy.

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